Internal Ex-Post Evaluation for Technical Cooperation Project

conducted by Laos Office: May, 2016

Country Name	**The Upgrading Information Technology Education Project (Information Technology Bridging Course)**
Lao People's Democratic Republic	

I. Project Outline

Background	The government of Lao PDR (GOL) had faced the needs for developing the education system in order to provide human resources whose Information Technology (IT) skills would conform to international standards in modernized systems used in governmental and private sectors. The National University of Laos (NUOL) was established in 1996 and was the only university in the country at that time. Even though the Faculty of Engineering (FE), with a quarter of NUOL students, was the biggest faculty, there were only 50 graduates with a bachelor degree in electrical and electronic engineering in 2001 and 2002. In order to develop future human resources efficiently in the IT field, it was urgently needed to develop an education system which could produce graduates efficiently and quickly. In fact, a JICA-supported project, so-called Diploma Program NUOL-KMITL, which aimed at producing Bachelor degree holders in FE through dispatching 12 staff from FE to King Mongkut's Institute of Technology Ladkrabang (KMITL) in Thailand, was implemented from 1999 to 2001. As the successor to this Diploma Program, this project was implemented to establish the Bachelor's degree course by FE itself.				
Objectives of the Project	Through developing a curriculum for a Bachelor degree course in the IT field, procuring and improving management of facilities and equipment, training teaching staff, developing teaching materials, properly implementing operation and administration of the course, and strengthening research capabilities of teaching staff, the project aimed at enabling FE to run the Bachelor degree course in the IT field, thereby contributing to producing IT human resources effectively to fill the demands of governmental/industrial sectors. The project objectives set forth are as follows: 1. Overall Goal: FE will be able to produce IT human resources effectively to fill the demands of governmental/industrial sectors. 2. Project Purpose: FE is capable to run a Bachelor degree course in Information Technology field.				
Activities of the Project	1. Project site: Vientiane 2. Main activities: (1) Develop IT curriculum of NUOL; (2) Improve management of facilities and equipment for IT program; (3) Procure necessary facilities, tools and equipment for IT program; (4) Select and train teaching staff for IT Department; (5) Prepare IT glossary and teaching materials/textbooks; (6) Operate IT program (select students, invite foreign and local lecturers, monitor registration, orientation and enrolment of students and teaching and learning activities, and organize study trip for students, etc.); and (7) Strengthen research capabilities of teaching staff in IT related fields (train teaching staff on research methodology and promote academic exchanges with other universities and international joint research activities in IT related fields, etc.) 3. Inputs (to carry out above activities) Japanese Side 1. Experts: 141 persons (Japanese:31, Thai:110) 2. Trainees received in Japan: 5 persons 3. Training in third country (Thailand): 77 persons 4. Provision of machinery and equipment 5. Local cost Laotian Side[1] 1. Staff allocated: 27 persons 2. Land and facilities: Necessary security for all laboratories and equipment, office space for the experts, computer rooms and classrooms 3. Local cost				
Ex-Ante Evaluation	2002	Project Period	April 2003 to March 2008 (of which extended period: April 2006 to March 2008)	Project Cost	341 million yen
Implementing Agency	Faculty of Engineering, National University of Laos (NUOL)				
Cooperation Agency in Japan	Tokai University and Meiji University				

II. Result of the Evaluation

<Issues to be considered at ex-post evaluation>

As one of the indicators for the Project Purpose was too general, supplemental information was used based on project reports to correctly assess the degree of achievement. Also, the target figures of some indicators for the Project Purpose and the Overall Goal related to the number of students and graduates were revised, as the project period was extended.

1 Relevance

<Consistency with the Development Policy of Laos at the time of ex-ante and project completion>

The project was consistent with Lao PDR's development policy on 'development of human resources in the IT field' as set forth in "the Fifth Five-Year National Social Economic Development Plan (NSEDP)(2001-2005)", "the policy for industrialization and modernization (January 2003)", and "the Sixth NSEDP (2006-2010)" at the time of both ex-ante evaluation and project completion.

<Consistency with the Development Needs of Laos at the time of ex-ante and project completion>

The project met social needs for human resources in the IT field in order to enhance productivity, efficiency and optimum utilization of

[1] This includes inputs of the original period only due to unavailability of information.

resources, which would promote economic and national development in Lao PDR. According to the ten related government or private organizations surveyed for the ex-post evaluation, development of human resources in IT fields was continuously important at the time of project completion.

<Consistency with Japan's ODA Policy at the time of ex-ante evaluation>

The project was consistent with Japan's ODA policy, as stated in the "ODA Country Data Book" (2002), which prioritized higher education and human resource development in state-owned companies, private companies, and financial sectors, etc.

<Evaluation Result> In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Status of Achievement for Project Purpose at the time of Project Completion>

The Project Purpose was mostly achieved by the time of project completion. FE mostly became able to run a Bachelor degree program in IT by itself (Indicator 1), as trainings were continuously conducted to improve teaching skills of teaching staff, six papers from four research works were presented in the first Joint International Conference on Information Communication Technology (JICT), all the necessary administrative tasks were conducted by Laotian staff independently and sufficiently, and teaching materials required for most of the subjects of the IT Bridging Course were developed. The total number of graduates from the course reached 98 with approximately 90% passing rate on average, which exceeded the target figure (72 graduates and 80% passing rate) (Indicator 2). While the available data is limited, at least nine NUOL staff graduated from the course and all of them remained in the course to teach students (Indicator 3). According to the questionnaire survey conducted to students and graduates, most of them replied that the course was effective (Indicator 4).

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The continuation status of project effects is partially achieved. Trainings for teaching staff have continuously been provided, however, it should be noted that training sessions are funded by donors and provided by external experts. No research was conducted from 2008 to 2011 due to lack of staff, equipment and financial support because many FE's staffs went abroad for study. As for equipment, FE could not use them for some specific areas of research because some researches need specific equipment and software license. However, one or two research works per year have been conducted since 2012. While, according to FE, all the necessary administrative tasks have been conducted by Laotian staff independently and sufficiently, IT Division, which was established in 2008 and has 12 staffs, has been responsible for running the IT course, conducting the research works and all activities related to the course. The teaching materials developed under the project are still used in the classes to teach basic IT. FE also supports some budget for lecturers in order to add or update some information in textbooks or teaching materials of the subjects they teach as necessary. In total, 326 students graduated from the IT Bridging Course during the period between project completion and this ex-post evaluation, with approximately 90% passing rate on average. Among nine NUOL staff who graduated from the course, two of them no longer remain in FE, as they currently work outside of FE. Appreciation of the course by students, graduates and organization or related governmental offices is high.

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

The Overall Goal was mostly achieved at the time of ex-post evaluation. The total number of graduates from the IT Bridging Course reached 424 with approximately 90% passing rate on average, which exceeded the target figure (408 graduates and 80% passing rate). Moreover, the total number of graduates from the "1+4 Years" Curriculum (a new curriculum of the IT Department which was established in 2006 based on the IT Bridging Course to produce additional 48 graduates each year) reached 321 with approximately 90% passing rate on average, which exceeded the target figure (288 graduates and 80% passing rate) (Indicator 1). A survey for the ex-post evaluation found that most of graduates from the IT Bridging Course with Bachelor degree have successfully utilized their IT skills and knowledge to their work (Indicator 2), and that most of organizations or related governmental offices have highly appreciated the IT Bridging Course and its graduates' IT skills (Indicator 3).

<Evaluation Result> The project managed to establish a training framework for teaching staff and administration and management framework of the IT Bridging Course, produce several outcomes from research works, develop necessary teaching materials, and produce sufficient number of graduates including those who remained in the course to teach students. The course was also highly appreciated by students, graduates and organizations or related governmental offices. Although research works were not conducted for four years after project completion, since 2012 at least one or two research works per year have been conducted. Nor have teaching materials been periodically revised but necessary information have been added when needed. The degree of achievement of the overall goal is mostly high at the time of ex-post evaluation as FE has become able to produce IT human resources effectively to fill the demands of governmental/industrial sectors. Therefore, effectiveness/impact of the project is high.

3 Efficiency

The project cost was significantly higher than planned (ratio against the plan: 227%) and the project period was significantly longer than planned (ratio against the plan: 167%), as the project period needed to be extended to enhance research and teaching capacity of teaching staff and to strengthen the administrative system of the IT Bridging Course. Therefore, efficiency of the project is low.

On the other hand, the terminal evaluation found the utilization of the third country experts/training (i.e. cooperation with King Mongkut's Institute of Technology Ladkrabang in Thailand (KMITL)[2]) and contracting out of part of project implementation to Japanese universities were a good combination of inputs in a way that the third country experts/training were for day-to-day technical transfer with minimum communication barriers for the Laotian counterparts, and the Japanese experts transferred more advanced technologies.

4 Sustainability

<Policy Aspect>

The Seventh NSEDP (2011-2015) states that Information and Communication Technology (ICT) units have to be established in the ministries, ICT trainings will be provided to staff in the priority ministries and expanded gradually to other ministries, and a legal framework has to be developed to support ICT development and use. Thus, the importance of IT education is supported by Lao PDR's development policy.

<Institutional Aspect>

At the time of ex-post evaluation, there are 300 staff in total in FE and 34 staff in total in the IT Department. 34 staff are comprised of one Head of IT Department, two Vice-Heads of IT Department, four Heads of Subject Divisions (IT Division, Computer Division, Student

[2] The KMITL experts had a good understanding of the Japanese technical cooperation, as Japan/JICA and the KMITL have bee in a more than 50-year cooperative relationship. This contributed to the smooth technical transfer in this project.

Administrative Division and LIBIC Center "Lao IT Business Incubation Center") and 27 teaching staff including eight staff continuing their Master's degree at FE and six staff continuing their PhD degree abroad. There are 12 staffs assigned for IT Bridging Course, as all of them belong to IT Division, all of IT Bridging Course staff have to teach the students in the course as well as to do administrative tasks due to the insufficient quota for administrative purpose. The current number of staff in the IT Bridging Course, which is allocated according to quota, is not sufficient to undertake all the necessary tasks of course management, therefore, FE does not periodically revise teaching materials and continuously uses the materials developed under the project and those prepared by experts. For future prospects, FE has a plan to separate from NUOL and will be established itself to be called as "University of Technology" start form 2017, when the numbers of staff is expected to increase to 1,160 in total (800 teachers, 160 administrative staff, and 200 assistant staff).

<Technical Aspect>

Pedagogical and research skill level of staff in the IT Bridging Course is sufficient (see also Effectiveness/Impact), but FE still faces the problem in terms of conducting research works due to the limited budget. According to FE, trainings on maintenance of the facilities and equipment procured under the project are conducted for staff of the IT Bridging Course before starting every semester, and the framework and mechanism for management of facilities and equipment established under the project are continuously utilized. All inventory lists are monitored by FE's Campus Division at the end of every semester, while regulations for using the Lab, equipment monitoring rules and a procedure with formats for renting equipment out are managed by the Administrative Division. However, many equipment among those procured under the project are out of order, especially PC since the life of PC is shorter than 7 years, and some of them were repaired but others have been replaced. Other equipment such as Zoom-Type Microscope and Hot Plate (a device for heating experiment) are still in use.

<Financial Aspect>

Since IT Department was established, the operation of the course has been at least covered by its own revenue. The revenue is from registration fees, tuition fees, and certificate fee, etc. In academic year 2014, the total revenue from these fees were 319 million LAK, and it covered the expenditures for personnel, maintenance of facilities/equipment and training that amounted to 138 million LAK. According to FE, however, the current amount of revenues in the IT Bridging Course is not sufficient to undertake all the necessary tasks such as research works and other activities. For example, needs surveys in IT industry, which was supposed to be periodically conducted to verify whether the curriculum of the IT Bridging Course is useful for Lao society but have not been conducted due to lack of budget. Some financial supports are available from Asian Development Bank (ADB), some equipment were donated by domestic private companies such as Phoubia Mining Company a few years ago as they aimed to promote their Company and some equipment are donated by graduates.

<Evaluation Result> Some problems have been observed in terms of institutional, technical and financial aspects of the implementing agency. Therefore, sustainability of effects of the project is fair.

5 Summary of the Evaluation

The project mostly achieved its Project Purpose and mostly achieved its Overall Goal. Sufficient number of graduates have been produced by both the IT Bridging Course and "1+4 Years" Curriculum. However, In terms of sustainability, there are some challenges in institutional, technical and financial aspects, as the number and manifestation of technical skills of staff and the amount of revenues of the IT Bridging Course are not sufficient. As for efficiency, both project cost and project period significantly exceeded the plan, as development of research and teaching capacity of teaching staff and strengthening of the administrative system required longer time than planned.

In light of the above, this project is evaluated to be Partially Satisfactory.

III. Recommendations & Lessons Learned

<Recommendations for Implementing Agency>

1. So far, FE has not conducted the Needs Surveys in IT industry in Lao PDR due to lack of budget. However, needs surveys are important to verify whether the curriculum of the IT Bridging Course is useful and appropriate for Lao society, thus efforts should be made.
2. Advancement of technology is fast, and thus FE should revise and update teaching manuals and textbooks by themselves, instead of continuously using teaching materials developed by experts.
3. Some necessary information on teaching materials and financial statements, etc. was not provided by FE. Information should be well managed through improvement of management and administrative system.

<Lessons Learned for JICA>

Although adjudged to have largely achieved the overall goal in such a way that the number of graduates and passing rate of the course supported by this project were larger than expected, the project has been evaluated as "partially satisfactory" as costs and implementation periods significantly exceeded planned allocations. This was because the project period needed to be extended to enhance research and teaching capacity of teaching staff and to strengthen the administrative system of the course. As such, JICA must consider to set adequate project period (e.g. as many as five years or in two phases) for a higher education project that aims to support a new course or institution in a university.

On the other hand, utilization of third country experts/training and the contracting out of dispatch of Japanese short-term experts to Japanese universities could enhance technical transfer in an educational project with smaller inputs than only dispatching Japanese experts/accepting trainees only in Japan. In such a case, however, the appropriateness of the source of the third country experts should be sufficiently considered based on past experience (e.g. in case of this project, good understanding of Japanese technical cooperation based on the long history of cooperation with Japan/JICA).

Photo 1. Computers Desk Top donated by JICA

Photo 2. Library in Computer Engineering and Information Technology Department, FE

Attachment

Achievement of Project Purpose and Overall Goal

<table>
<tr><th>Aim</th><th>Indicators</th><th>Results</th></tr>
<tr><td rowspan="6">(Project Purpose)
FE is capable to run a Bachelor degree course in Information Technology field.</td><td colspan="2">1. NUOL FE is able to run a Bachelor degree program in IT by itself.</td></tr>
<tr><td>(Supplemental information)
Training framework for new and current teaching staffs is utilized in FE to continuously improve their teaching skills.</td><td>Status of achievement: Achieved (continued)
(Project Completion) Training sessions were conducted every year before starting a semester especially for new teaching staff and for new subjects. Other methods were also utilized such as several On-the-Job-Training (OJT) schemes and teachers' meetings to share colleague's teaching styles.
(Ex-post Evaluation) Trainings have been provided by external experts from Japan, Singapore and the Philippines for approximately ten teaching staff in FE every year for two to three weeks. The training is financed by donors. Other methods such as OJT and Teaching Assistance (TA) have also been utilized.</td></tr>
<tr><td>(Supplemental information)
Three simple research works are conducted, several research groups are set up and research promotion activities are regularly held.</td><td>Status of achievement: Achieved (partially continued)
(Project Completion) Four research fields were set up and six papers from these research fields were presented in the first JICT in 2007. A Robot contest was continuously organized during the project period.
(Ex-post Evaluation) Though, no research was conducted from 2008 to 2011 due to lack of staff, equipment and financial support, one or two research works per year have been conducted since 2012. Since the project completion, a robot contest also has been conducted once a year.</td></tr>
<tr><td>(Supplemental information)
All the necessary administrative tasks including financial management, personnel management, admission of students, information/data management and organizing academic events are conducted independently and sufficiently.</td><td>Status of achievement: Achieved (partially continued)
(Project Completion) All the necessary administrative tasks were conducted by IT Division staff independently and sufficiently. FE established IT Division in 2008, which has 12 staffs and is responsible for teaching and learning management, conducting researches, providing IT service to society and conducting relevant activities and training programs for students.
(Ex-post Evaluation) All the necessary administrative tasks have been conducted by IT Division staff independently and sufficiently. However, data management is not functioning well because the main staff in charge at the time of project completion has been continuing their education abroad while the detailed information was lost due to the computer being broken down.</td></tr>
<tr><td>(Supplemental information)
Teaching materials required for all the subjects of IT Bridging Course are developed and periodically revised.</td><td>Status of achievement: Mostly achieved (partially continued)
(Project Completion) Ten textbooks and 20 teaching manuals were to be developed under the project, and ten textbooks and 18 teaching manuals were actually developed.
(Ex-post Evaluation) While FE has added and updated some necessary information to the teaching materials developed under the project, these materials have not been periodically revised.</td></tr>
<tr><td>2. At least 80% of admitted students are graduated every year, and the total graduates from the IT course reaches about 50 by the end of the project (=72 graduates by the end of the extended period).</td><td>Status of achievement: Achieved (continued)
(Project Completion) The number of graduates from the IT Bridging Course by project completion was 98 with approximately 90% passing rate on average.
<table>
<tr><th></th><th>Enrollment Year</th><th>Graduation Year</th><th>Number of Entrants</th><th>Number of Graduates</th><th>Passing Rate</th></tr>
<tr><td>Group A</td><td>2003</td><td>2005</td><td>31</td><td>26</td><td>83.9%</td></tr>
<tr><td>Group B</td><td>2004</td><td>2006</td><td>38</td><td>36</td><td>94.7%</td></tr>
<tr><td>Group C</td><td>2005</td><td>2008</td><td>40</td><td>36</td><td>90.0%</td></tr>
<tr><td>Total</td><td></td><td></td><td>109</td><td>98</td><td>89.9%</td></tr>
</table>
(Ex-post Evaluation) The number of graduates from the IT Bridging Course since project completion is 326 with approximately 90% passing rate on average.
<table>
<tr><th></th><th>Enrollment Year</th><th>Graduation Year</th><th>Number of Entrants</th><th>Number of Graduates</th><th>Passing Rate</th></tr>
<tr><td>Group D</td><td>2006</td><td>2009</td><td>39</td><td>39</td><td>100.0%</td></tr>
<tr><td>Group E</td><td>2007</td><td>2010</td><td>38</td><td>36</td><td>94.7%</td></tr>
<tr><td>Group F</td><td>2008</td><td>2011</td><td>39</td><td>37</td><td>94.9%</td></tr>
<tr><td>Group G</td><td>2009</td><td>2012</td><td>51</td><td>36</td><td>70.6%</td></tr>
<tr><td>Group H</td><td>2010</td><td>2013</td><td>71</td><td>63</td><td>88.7%</td></tr>
<tr><td>Group I</td><td>2011</td><td>2014</td><td>73</td><td>73</td><td>100.0%</td></tr>
<tr><td>Group J</td><td>2012</td><td>2015</td><td>56</td><td>42</td><td>75.0%</td></tr>
<tr><td>Total</td><td></td><td></td><td>367</td><td>326</td><td>88.8%</td></tr>
</table>
The reason for the lower passing rates in 2012 and 2015 than the other years is unknown.</td></tr>
<tr><td>3. Through the IT course, many teaching staff with a Bachelor degree are developed and remained in the course to teach students.</td><td>Status of achievement: Achieved (partially continued)
(Project Completion) While data on Group A was not available, all the NUOL staff in Group B who graduated from the course remained in NUOL.
<table>
<tr><th></th><th>Enrollment Year</th><th>Number of NUOL Staff who Graduated from IT Bridging Course</th><th>Of which, Number of Staff who remained in NUOL</th></tr>
<tr><td>Group A</td><td>2003</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Group B</td><td>2004</td><td>9</td><td>9</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td></td><td>
<table>
<tr><td>Group C</td><td>2005</td><td>9</td><td>2</td></tr>
</table>
(Ex-post Evaluation) Two staff from Group B have left FE (one works for the Ministry of Education and Sports, and the other has own business). There are 12 permanent teaching staff in IT Course including those who graduated from the course.
</td></tr>
<tr><td></td><td>4. Most of current students and graduates highly appreciate the IT course.</td><td>Status of achievement: Achieved (continued)
(Project Completion) According to the questionnaire survey conducted to Group B and Group C students in 2005, approximately 90% of a total of 67 respondents on average replied positively as “very effective” or “effective”. The questionnaire survey conducted to graduates in 2005 (ex-Group A students, but the number of respondents is unknown) also revealed that more than 90% replied that the course was effective for their jobs.
(Ex-post Evaluation) According to the simple questionnaire survey conducted to 15 current students at the time of Ex-Post Evaluation, all the students answered the questionnaires as appreciated the IT Bridging course because it helped and improved their knowledge and their skills a lot, and among them, 93% (14 students) responded as highly appreciated (“very effective”).</td></tr>
<tr><td>(Overall Goal)
FE will be able to produce IT human resources effectively to fill the demands of governmental/industrial sectors.</td><td>1. By the end of year 2010, there will be approximately 300 IT human resources (as a total of 7 graduates’ groups with a 80% passing rate) for governmental/industrial sectors (=408 graduates from IT Bridging Course and 288 graduates from “1+4 Years” Curriculum by 2015).</td><td>Status of achievement: Achieved
(Ex-post Evaluation) The total number of graduates from the “1+4 Years” Curriculum is 321. The total number of graduates from the IT Bridging Course is 424 (See Indicator 2 of Project Purpose).
[Number of Graduates from “1+4 Years” Curriculum]
<table>
<tr><th>Enrollment Year</th><th>Graduation Year</th><th>Number of entrants</th><th>Number of Graduates</th><th>Passing Rate</th></tr>
<tr><td>2006</td><td>2010</td><td>37</td><td>35</td><td>94.6%</td></tr>
<tr><td>2007</td><td>2011</td><td>35</td><td>27</td><td>77.1%</td></tr>
<tr><td>2008</td><td>2012</td><td>35</td><td>34</td><td>97.1%</td></tr>
<tr><td>2009</td><td>2013</td><td>84</td><td>78</td><td>92.9%</td></tr>
<tr><td>2010</td><td>2014</td><td>132</td><td>110</td><td>83.3%</td></tr>
<tr><td>2011</td><td>2015</td><td>45</td><td>37</td><td>82.2%</td></tr>
<tr><td colspan="2">Total</td><td>368</td><td>321</td><td>87.2%</td></tr>
</table>
</td></tr>
<tr><td></td><td>2. Most of the graduates from the IT course with Bachelor degree successfully utilize their skills of IT at their own office.</td><td>Status of achievement: Mostly achieved
(Ex-post Evaluation) According to the simple questionnaire survey conducted to 15 graduates at the time of Ex-Post Evaluation, all of them who obtained Bachelor degree from IT Bridging Course have successfully utilized their IT skills at their own office in Laos as they can develop software, security protection system etc., in their own office.</td></tr>
<tr><td></td><td>3. Most organizations or related governmental offices highly appreciate the IT course and its graduates’ IT skills.</td><td>Status of achievement: Mostly achieved
(Ex-post Evaluation) According to the simple questionnaire survey conducted to 10 organization or related governmental offices at the time of Ex-Post Evaluation, all of them highly appreciated the IT Course and its graduates’ IT skills as its graduates’ IT skills have improved a lot.</td></tr>
</table>

Source : JICA internal documents, Terminal Evaluation Report, Questionnaire survey to FE, Questionnaire surveys to students, graduates and organizations/governmental offices.

Notes: 1) Indicator 1 of Project Purpose (“By the end of year 2005, NUOL FE is able to run a Bachelor degree program in IT by itself.”) is a rephrasing of the Project Purpose itself. Thus, supplemental information was used based on project reports to correctly assess the degree of achievement. 2) The target values for the Indicator 2 of Project Purpose and Indicator 1 of Overall Goal were revised according to conditions set in project reports, as the project period was extended. Indicator 2 of Project Purpose: the target number of graduates is at least 72 by March 2008, calculated as 30 entrants/year (quota) x 3 batches = 90 entrants x 80% passing rate = 72 graduates. Indicator 1 of Overall Goal: the target number of graduates from the IT Bridging Course only is calculated as 30 entrants (quota) in 2005, 2006 and 2008, and 60 entrants (quota) from 2009 onwards = total 510 entrants by 2015 x 80% passing rate = 408 graduates by 2015, and that of the “1+4 Years” Curriculum is calculated as 60 entrants/year from 2010 onwards x 6 years = 360 entrants x 80% passing rate = 288 graduates.